Preliminary Science Flight Report
Operation IceBridge Arctic 2011

Flight: **TBD**
Mission: **Box 2 Flight 1 (2 pilot option)**

Flight Report Summary

Aircraft	**LaRC B200 (NASA529)**
Flight Number	TBD
Flight Request	11-021 LaRC
Date	Friday, April 15, 2011 (Z)
Purpose of Flight	Monitor surface elevation in the southern most part of Greenland, flying southern ICESat tracks, and starting the 5 km coastal grid in Box 2 (West of Narsarsuaq).
Take off time	10:30 Zulu from Kangerlussuaq (BGSF); TBD Zulu from Narsarsuaq (BGBW)
Landing time	TBD Zulu at Narsarsuaq (BGBW); 1920 Zulu at Kangerlussuaq (BGSF)
Flight Hours	~10
Aircraft Status	Airworthy.
Sensor Status	All installed sensors operational.
Significant Issues	None
Accomplishments	• High-altitude survey (28,000 ft AGL) of the southern tip of Greenland west of Narsarsuaq along 4 ICESat ground tracks. • LVIS and camera were operated on the survey lines. • Ramp pass at 12000 ft at BGSF. • Pitch and Roll maneuvers over frozen fjord at BGSF and over open water fjord at BGBW.
Geographic Keywords	Narsarsuaq, Southern Greenland
ICESat/CryoSat Track	ICESat tracks 1297, 1290, 55, 174
Repeat Mission	No

Science Data Report Summary

Instrument	Instrument Operational			Data Volume	Instrument Issues
	Survey Area	Entire Flight	High-alt. Transit		
LVIS	☑	☑	☑	~100 GB	None
LVIS Camera	☑	☑	☑	~20 GB	None
POS/AV	☑	☑	☑	~3 GB	None

Mission Report (David Rabine, Instrument Operator and Lora Koenig, Mission Scientist)

Today's mission starts the B200 deployment in Greenland and the first day that Opearation IceBridge operated two NASA planes simultaneously. It is the first time the B200 has flown in Greenland and the first time that LVIS has been on this particular aircraft. Onboard the aircraft were pilots Richard (Rick) Yasky and Leslie (Les) Kagey and LVIS Operator David Rabine. Despites the many first of the day the crew and instrument exceeded all expectations. They completed all the planned flight lines and picked up and additional grid line, line 209. Today flights showed the B200's endurance with a nearly full fuel load to be around 5 hours of flight time at ~230 knots and 28,000ft.

Today we took advantage of the two pilots and clear weather in the South to complete the two highest priority missions in the highest priority box, Box 2, west of Narsarsuaq. In order to do this we extended the operating hours at Kangerlussuaq.

The plane took off at 1023 Z and after a 12,000 ft ramp pass headed south on ICESat track 1290 for ~330 nmi. Upon reaching the southern end of the ice sheet the plane followed ICESat tracks 55 and 174 for ~100 nmi each. These lines completed the desired ICESat tracks in Box 2 and the plane completed 3-10 km grid lines closest to the coast before landing in Narsarsuaq.

The plane refueled at Narsarsuaq. It took 56 minutes to land, refuel and take off. The pilots feel this is the minimum amount of time on the ground. After takeoff in Narsarsuaq the plane continued to fly the 10 km grid lines from the coast inland. High cross winds were experienced during these grid lines. The mission returned north to Kangerlussuaq on ICESat track 1297 for ~160 nmi before landing at Kangerlussuaq and approximately 1920 Z.

Below are the detailed Flight notes from the Instrument Operator. Times from the Instrument Operator on the plane are in local Kangerlussuaq time (-2 hours from Z)

NOTE: Bank angle went to ~ 30 degrees right after takeoff. I called the pilots ASAP about bank. Got an airport pass at 12,000 feet, not sure if we actually got over the ramp, but we were over the runway for sure.

07:00 Plane is being pulled out of the hangar
07:23 Applanix 510 and 610 are both turned on
07:24 100 Hz GPS recording ON
08:00 Buttoned up and ready to fly.
08:12 Switched from ground power to engine, and clean... no brown out, everything stayed up.
08:23 Take off
08:38 NOTE: Frequency 126.2 transmit shows up on our detectors, but only during transmit
09:16 Some ATC radio transmissions on the detector signal (and were also some at the start of the line ICEsat track 1290)

09:27 Applanix and GPS everything looks good and stable
10:46 Long lines (ICESat track 1290) complete, slight turn to align on North bound leg
11:02 Missed the turn with stronger winds from a direction different than predicted
11:03 Smoother ice on the way up than the last past. Water is pretty glassy smooth near the coast, RNP will have to be further out than we got I think.
11:05 Laser Temperature is 48C and ADC3255 is 62.4C
11:21 Turning to next line, was mostly on the line, auto pilot was between 1 and -2 degree and straying a little from the line but not bad.
12:03 Rolls, then pitches then rolls. Islands below us, but the maneuver looked good.

Landed at Narsarsuaq
Did ~ 4 minutes power on before spinning down Applanix units
Refueled
Window did ice a little on the ground, but mostly toward the aft / camera, and cleared up quickly
Ran 10 minutes Applanix stationary before moving again
Took off from Narsarsuaq

15:37 we've been flying around the south with lots of rock, water and snow (along with outlet glaciers)
15:39 NOTE: Some clouds on the west and east of our lines, so during turns we are occasionally going through cloud layers

Individual instrument reports from experimenters on board the aircraft:

LVIS: Worked well, there was interference received from random radio transmissions.

LVIS Camera: Worked well, no issues.

POS/AV: Worked well, no issues.

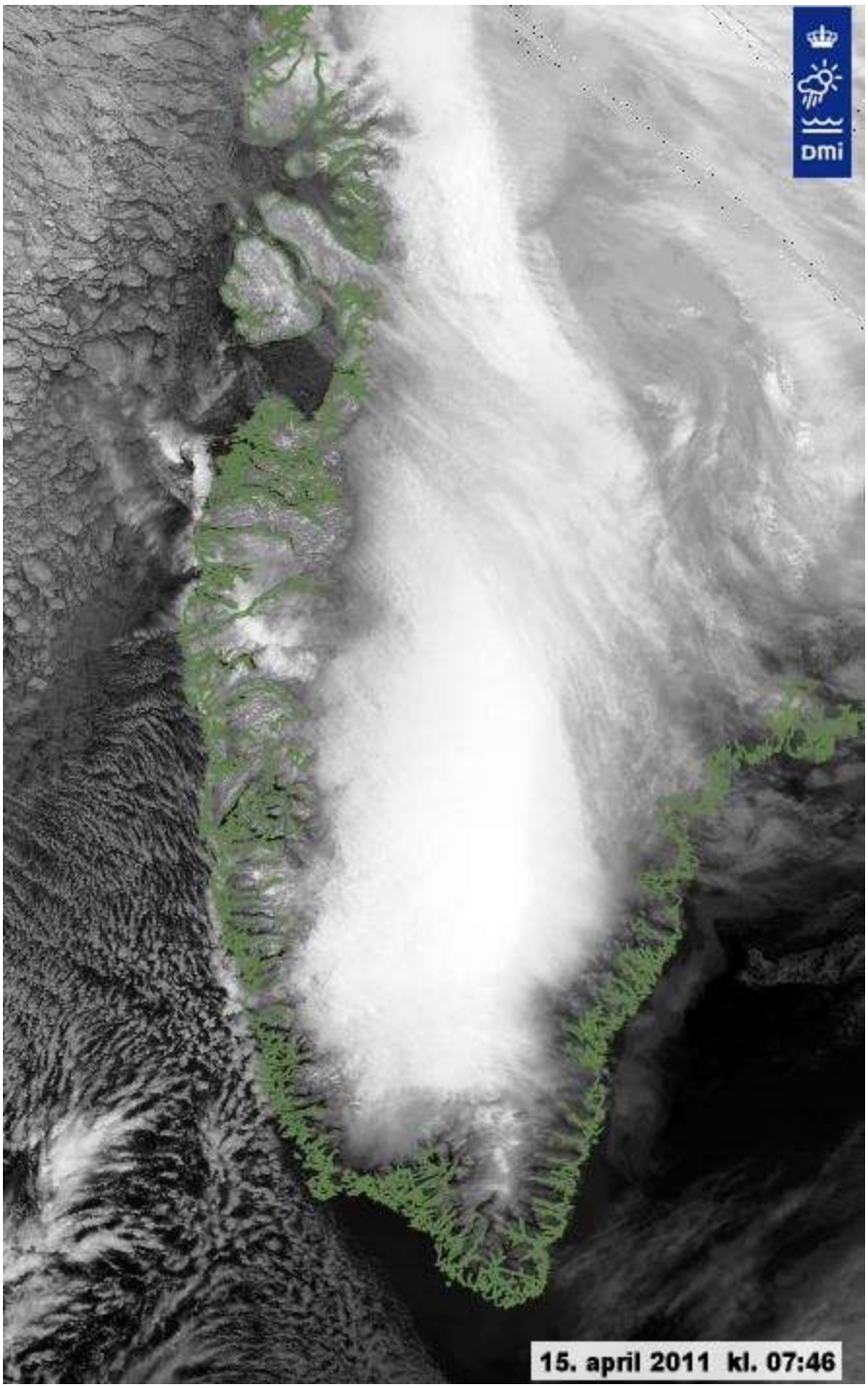

Figure 1: IR Satellite image taken ~45 minutes before mission take off time.

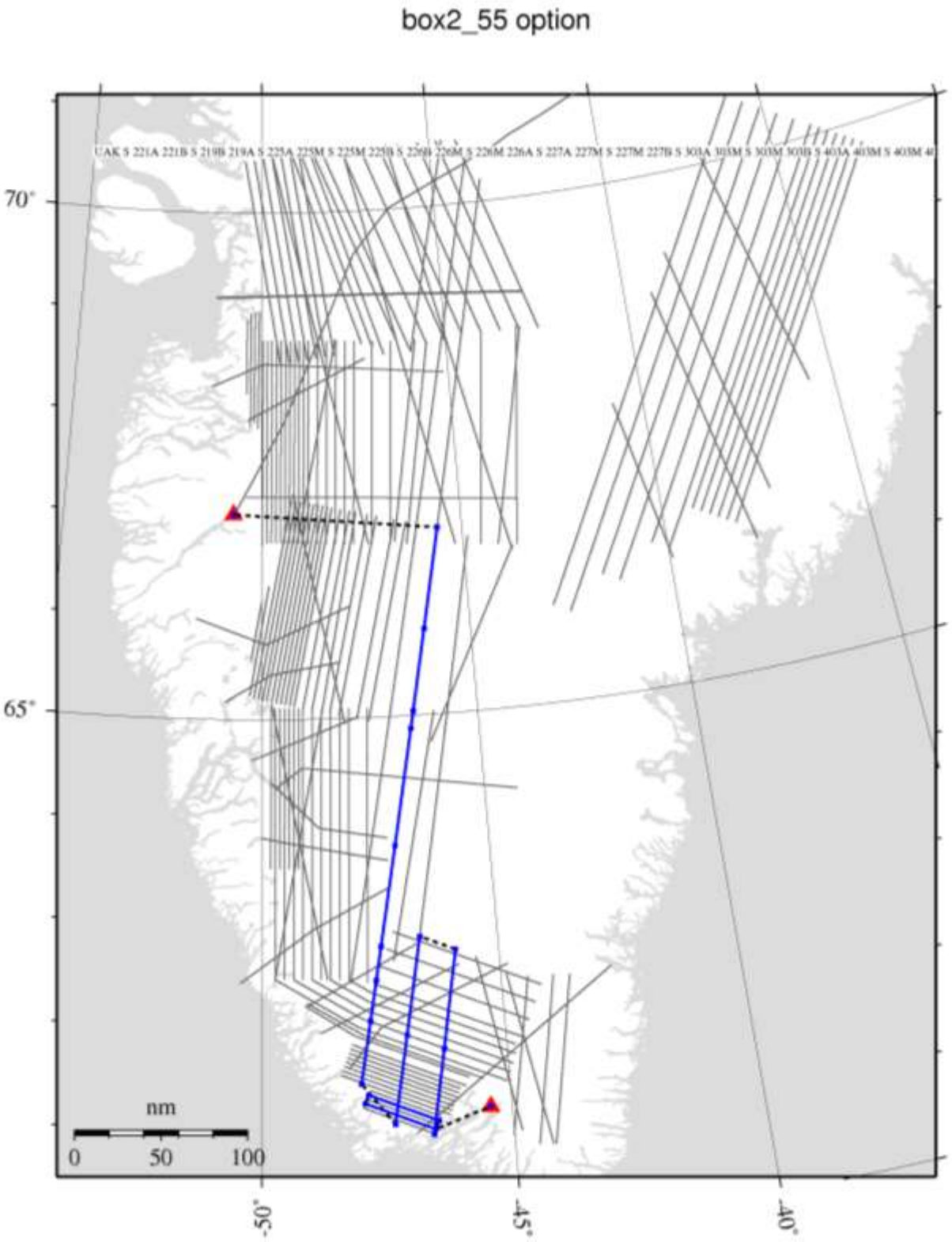

Figure 2: Proposed flight plan from Kangerlussuaq to Narsarsuaq

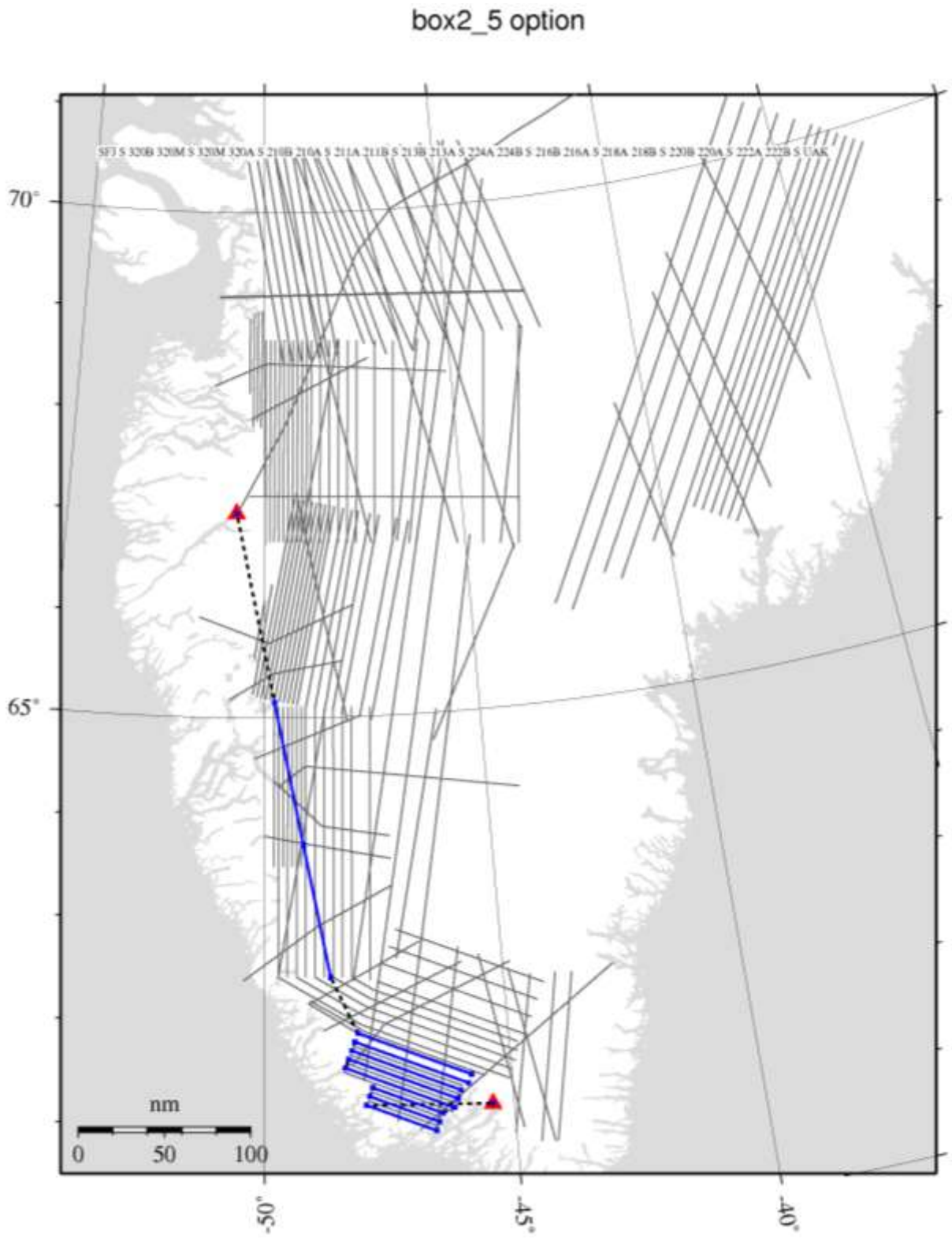

Figure 3: Proposed flight plan from Narsarsuaq to Kangerlussuaq